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International application number: PCT/AU05/000137

International filing date: 04 February 2005 (04.02.2005)

Document type: Certified copy of priority document

Document details: Country/Office: AU
Number: 2004902475
Filing date: 11 May 2004 (11.05.2004)

Date of receipt at the International Bureau: 22 February 2005 (22.02.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland
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I, JANENE PEISKER, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2004902475 for a patent by TELEZYGOGOLOGY INC. as filed on 11 May 2004.



WITNESS my hand this
Fourteenth day of February 2005

A handwritten signature in black ink, appearing to read 'J. Peisker'.

JANENE PEISKER
TEAM LEADER EXAMINATION
SUPPORT AND SALES

AUSTRALIA
Patents Act 1990
PROVISIONAL SPECIFICATION
FOR A PROVISIONAL PATENT

Name of Applicant: **TELEZYGOLOGY INC.**

Actual Inventor:

Address for Service:

Chrysiliou Law
Patent and Trade Mark Attorneys
15-19 Parraween Street
Cremorne NSW 2090

Invention Title: **Fasteners, Including Temporary Fasteners**

The following statement is a description of this invention

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This invention relates to fasteners. In some aspects, this invention relates to temporary fasteners. Reference is made to Australian Provisional Patent Application Nos. 2003902993 and 2004900529, the contents of which are imported herein by reference:

Patent application No. 2003902993 disclosed, in broad terms, a releaseable fastener
5 which included:

- a longitudinal body including a plurality of ratchet teeth;
- a first work engaging member suitably mounted on the longitudinal body;
- a second work engaging member mounted on, or integral with, the longitudinal body; and
- 10 a pawl element mounted on the longitudinal body for engagement with the ratchet teeth.

The second work engaging member including means capable of assuming a first position of narrow cross-sectional area and a second position of wide cross-sectional area.

- 15 The purpose of the ratchet teeth on the longitudinal body and the pawl element was to enable the first work engaging member to be pushed along the longitudinal body towards the work to be fastened. The use of ratchet teeth enabled a certain amount of adjustment of the pressure to be applied to the work surface or surfaces.

Patent Application No. 2004900529 disclosed arrangements which could replace the
20 ratchet teeth/pawl combination of Application No. 2003902993.

While the fasteners in Patent Application Nos. 2003902993 and 2004900529 could be releaseable fasteners, the disclosure below, at least in some embodiments, relates to non-releaseable fasteners. Such a fastener can be used as a temporary fastener or tack, especially in the aerospace industry, the fastener being removed by drilling out where it
25 is no longer required.

Broadly, the present invention provides a fastener including:

- a first longitudinal body having first engaging means; and
- a second longitudinal body having:
 - an opening adapted to receive the first longitudinal body; and

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second engaging means in at least part of the opening;

wherein the first and/or second engaging means is adapted to deform sufficiently to permit the first longitudinal body to slide axially through the opening in the second longitudinal body and wherein the second engaging means is adapted to engage the first
5 engaging means on the first longitudinal body when one longitudinal body is rotated relatively to the other.

In an especially preferred embodiment relevant to temporary fasteners or tack fasteners, the fastener of the present invention includes means capable of assuming a first position of narrow cross-sectional area and a second position of wide cross-sectional area. This
10 means is preferably part of or attached to the second longitudinal body.

It is further preferred that the first and second engaging means permit unidirectional movement of the first longitudinal body within the second longitudinal body so that, once the first longitudinal body is inserted in the opening in the second longitudinal body, the first longitudinal body cannot be pulled in one direction within the second
15 longitudinal body but cannot be pushed in the opposite direction.

The first longitudinal body is preferably a rivet made of a relatively hard plastic. The first longitudinal body may be suitable for manufacture by injection moulding.

The first longitudinal body may include the first engaging means for some or all of its length. One end of the first longitudinal body is preferably designed to engage an
20 insertion tool, while the other end preferably takes the form of a probe to assist in insertion into apertures in work pieces.

Each of the first and second engaging means may be chosen from a range of configurations, such as helical thread, grooves and projections, serrations, sharp-edged annular projections, burrs and other suitable gripping members. When the fastener of
25 the invention is designed to permit unidirectional movement of the first longitudinal body within the second longitudinal body, the first and second engaging means should operate so that there is ratchet effect between the first and second engaging means. The most preferred arrangement is one where the first engaging means is a helical thread or serrations, grooves/projections, etc, each having a shoulder adapted to engage a barb or
30 shoulder in the second engaging means, to prevent bidirectional movement of the first longitudinal body.

The second longitudinal body is preferably generally cylindrical, with the second engaging means located in one part of the cylinder. The means capable of assuming a

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first position of narrow cross-sectional area and a second position of wide cross-sectional area, when present, preferably comprises a continuation of the cylinder, the cylinder being segmented in this area. These means are preferably wings hinged to the remainder of the cylinder.

- 5 In one preferred embodiment, the second engaging means takes the form of threads or annular grooves and projections, adapted to deform and increase in cross-sectional area through longitudinal slits cut into the threads or grooves and projections. In a second preferred embodiment, the second engaging means is shaped in an appropriate manner, to allow the first longitudinal body to slide axially through the opening. The second
10 engaging means, in this embodiment, takes the form of internal threads or projections in at least part of the opening, and have an annular shape in cross-section, except that the annulus is shaped so that the inner periphery of the annulus is changed to the periphery of a hexagon. Other configurations may also be appropriate.

- It will be appreciated by one skilled in the art, having read the above disclosure, that the
15 relationship between the first and second engaging means will be such that the second engaging means permits axial movement, possibly unidirectionally, of the first longitudinal body within the opening, but can effect positive engagement of the first engaging means and the second engaging means when one longitudinal body is rotated relatively to the other .

- 20 While the above preferred embodiments refer to deformation of the second engaging means, it is to be appreciated that the fastener of the present invention may be constructed so that the first engaging means deforms, or so that there is some deformation of each of the first and second engaging means.

- Especially where it is the second engaging means which deforms, it is preferred that the
25 second longitudinal body is made from a relatively stiff plastic, such as glass-filled Nylon (trade mark). Suitable material is marketed by Du Pont, under the trade mark ZYTEL.

- The invention in its broadest form represents an extremely efficient, quick coupling fastener. When it is used as a temporary fastener or tacking rivet, it can permit rapid
30 attachment of work pieces with the ability to pull work surfaces together with a fine degree of adjustment.

The invention will now be described in connection with certain non-limiting examples described in the drawings, in which:

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Figure 1 is a longitudinal cross-section of a first embodiment of the fastener of the invention;

Figure 2 shows, on a small scale, the first and second longitudinal bodies of Figure 1;

5 Figure 3 is a cross-sectional view taken along the lines 3-3 of Figure 1;

Figure 4 illustrates in enlarged detail engagement of the first and second engaging means;

Figure 5 is a longitudinal cross-sectional view of a second embodiment of the invention;

10 Figure 6 is a cross-sectional view taken along the lines 6-6 of Figure 5; and

Figure 7 shows the embodiment of Figure 5 with the means capable of assuming first and second positions in the second position of wide cross-sectional area.

It will be appreciated that the embodiments in the drawings are illustrative of embodiments of a temporary fastener or tacking rivet. However, the drawings also
15 serve to illustrate how the invention would work in other situations, if the means capable of assuming the first and second cross-sectional area positions is omitted.

Referring first to Figures 1-4, fastener 200 has first longitudinal body 202 having first engaging means 204. In this embodiment, first engaging means 204 is a helical screw thread of 0.6mm pitch.

20 Second longitudinal body 206 has general cylindrical opening 208. Opening 208 continues through throat 210. Throat 210 has second engaging means, in this embodiment being internal helical threads 212. In the region of throat 210, second longitudinal body 206 has slits 214. Only one slit 214 is shown in Figures 1 and 2. Preferably, there are four such slits 214.

25 Second longitudinal body 206 includes wings 216. These are attached to longitudinal body 206 at hinges 218 and are preferably provided as four wings, two of which are shown in Figures 1 and 2.

First longitudinal body 202 includes probe 220 and stepped section 222, designed to fit into an insertion tool (not shown).

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First engaging means 204 and second engaging means 212 each includes shoulders 224 and 226 respectively (refer Figure 4). The engagement between these shoulders prevents first longitudinal body 202 from moving within opening 208 in a downward direction as shown in Figure 1. However, first longitudinal body 202 is able to move
5 upwardly within opening 208.

To operate fastener 200, first longitudinal body 202 is inserted into second longitudinal body 206, by feeding stepped portion 22 through opening 208 from end 228. The assembled fastener is then inserted into an insertion tool (not shown) which grips some or all of stepped portion 222. Assembled fastener 200 is inserted by the tool into
10 countersunk hole 230 in two or more work pieces, schematically shown at 232. The insertion tool is activated so that it pulls up first longitudinal body 202 to a preset tension, shoulders 224 ratcheting along shoulders 226. Movement of probe 220 upwardly with reference to Figure 1 causes wings 16 to flare out (in the same manner as shown in Figure 7) to hold work pieces 32 together. The insertion tool rotates first
15 longitudinal body 202 anti-clockwise to lock it in position in opening 208.

The protruding part of first longitudinal body 202 is trimmed off (by the insertion tool) flush with the head of counter sunk hole 30. The remaining part of first longitudinal body 202 maintains work pieces 232 together with the desired tension.

If fastener 200 is to be replaced by a permanent rivet, fastener 200 is drilled out and
20 replaced in known manner.

Turning now to Figures 5 to 7, fastener 240 is the same as fastener 200 in the first embodiment, except for the second engaging means. Whereas, in the first embodiment in Figures 1 to 3, slits 214 permitted sufficient deformation of threads 212 to allow unidirectional passage of first longitudinal body 202 within opening 208, in fastener 240
25 there are no slits 214. Instead, as can be seen from Figure 6, formed internally of second longitudinal body 236 are internal threads 234 which have been formed so that their internal periphery represents the periphery of a hexagon.

Threads 234 can flex sufficiently to permit external threads 204 on first longitudinal body 202 to pass through when first longitudinal body 202 is being drawn upwardly in
30 Figure 5. Threads 204 and threads 234 include shoulders as illustrated in Figure 4 for threads 204 and 212, for unidirectional movement.

The embodiment in Figures 5 to 7 operates the same as that described for Figures 1 to 4 in that first longitudinal body 202 is pulled up and twisted to lock it in place.

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It is possible that the second embodiment of the fastener can provide more strength compared to that in the first embodiment. The internal threads 234 in the second embodiment can deform horizontally without the requirement for slits 214 as in the first embodiment.

- 5 It will be appreciated by one skilled in the art that further modifications may be made to the invention without departing from the spirit and scope thereof.

Dated this 10th day of May 2004

TELEZYGOLOGY Inc.
by its Patent Attorneys
CHRYSILIOU LAW

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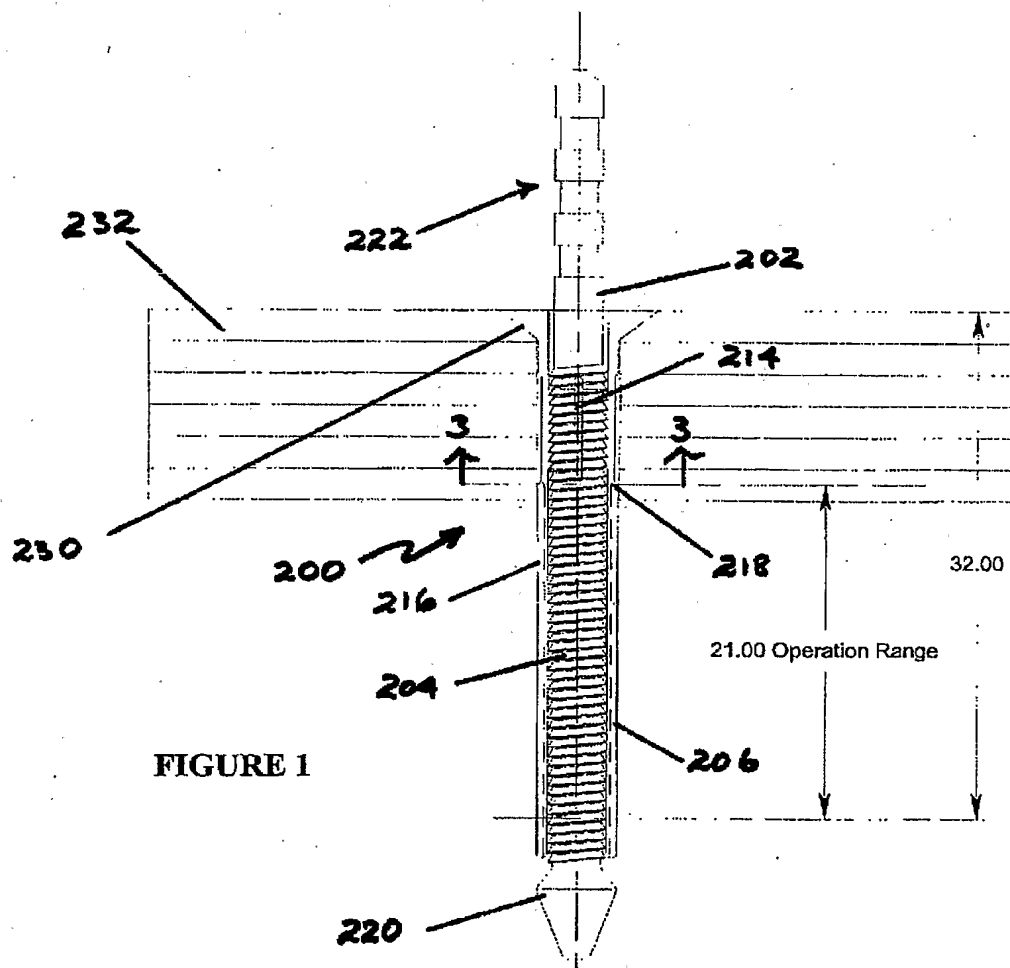


FIGURE 1

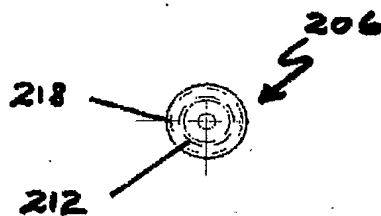


FIGURE 3

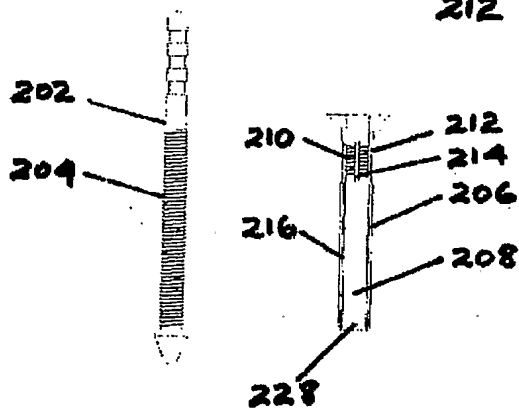


FIGURE 2

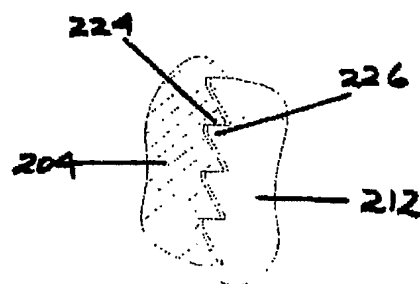


FIGURE 4

